

Listing of Claims

The following listing of claims will replace all prior versions, and listings, of claims in the subject application:

Claim 1 (cancelled).

- 1 ~~2~~ (currently amended) The A semiconductor device ~~according to claim 19~~ comprising:
- a semiconductor substrate of a first conductivity type;
 - a first cladding layer of said first conductivity type formed on said semiconductor substrate;
 - an active layer formed on said first cladding layer;
 - a second cladding layer of a second conductivity type formed on said active layer; and
 - a saturable absorbing layer formed on at least portions of at least one of said first cladding layer and said second cladding layer,
- wherein said saturable absorbing layer is formed to have a band gap energy either approximately the same as, or slightly smaller than, said active layer, and also to be doped with nitrogen (N) in an amount sufficient to form a localized level,
- wherein said saturable absorbing layer includes a III-V alloy material, and
- wherein said saturable absorbing layer comprises at least one of As and P.

15 ~~2~~ ~~3~~ (previously presented) The semiconductor device according to claim ~~19~~ ⁹, wherein said active layer, and said first and second cladding layers comprise AlGaInP alloy materials.

23 ~~4~~ (currently amended) ~~The A semiconductor device according to claim 19~~ comprising:

a semiconductor substrate of a first conductivity type;

a first cladding layer of said first conductivity type formed on said semiconductor substrate;

an active layer formed on said first cladding layer;

a second cladding layer of a second conductivity type formed on said active layer; and

a saturable absorbing layer formed on at least portions of at least one of said first cladding layer and said second cladding layer,

wherein said saturable absorbing layer is formed to have a band gap energy either approximately the same as, or slightly smaller than, said active layer, and also to be doped with nitrogen (N) in an amount sufficient to form a localized level,

wherein said saturable absorbing layer includes a III-V alloy material, and

wherein said saturable absorbing layer comprises an AlGaInNP alloy material.

13 ~~14~~ ~~5~~ (currently amended) ~~The semiconductor device according to claim 19~~ wherein said cladding layer comprises AlGaInP and wherein an AlGaInP intermediate layer is interposed between said cladding layer and said saturable absorbing layer, ~~said intermediate layer containing less Al than said cladding layer and no nitrogen.~~

14 ~~15~~ ~~6~~ (currently amended) ~~The semiconductor device according to claim 19~~ wherein said semiconductor device ~~comprises~~ is a self-pulsating semiconductor laser device.

Claims 7-12 (cancelled).

3 ~~4~~ 13 (previously presented) A semiconductor device comprising:

- a semiconductor substrate of a first conductivity type;
- a first cladding layer of said first conductivity type formed on said semiconductor substrate;
- an active layer formed on said first cladding layer;
- a second cladding layer of a second conductivity type formed on said active layer; and
- a saturable absorbing layer formed on at least portions of at least one of said first cladding layer and said second cladding layer,

wherein said saturable absorbing layer is a mixed crystal of nitrogen (N) with another group-V element and is formed to have a band gap energy either approximately the same as, or slightly smaller than, said active layer.

4 ~~5~~ 14 (previously presented) The semiconductor device according to claim 13, wherein said saturable absorbing layer comprises at least one of As and P.

5 ~~6~~ 15 (previously presented) The semiconductor device according to claim 13, wherein said active layer, and said first and second cladding layers comprise AlGaInP alloy materials.

6 ~~7~~ 16 (original) The semiconductor device according to claim 13, wherein said saturable absorbing layer comprises an AlGaInNP alloy material.

7 ~~8~~ 17 (previously presented) The semiconductor device according to claim 13, wherein

said cladding layer comprises AlGaInP and wherein an AlGaInP intermediate layer is interposed between said cladding layer and said saturable absorbing layer, said intermediate layer containing less Al than said cladding layer and no nitrogen.

8 9 18. (previously presented) The semiconductor device according to claim 13, wherein said semiconductor device comprises a self-pulsating semiconductor laser device.

9 19. (currently amended) A semiconductor device comprising:
a semiconductor substrate of a first conductivity type;
a first cladding layer of said first conductivity type formed on said semiconductor substrate;
an active layer formed on said first cladding layer;
a second cladding layer of a second conductivity type formed on said active layer; and
a saturable absorbing layer formed on at least portions of at least one of said first cladding layer and said second cladding layer,
wherein said saturable absorbing layer is formed to have a band gap energy either approximately the same as, or slightly smaller than, said active layer, and also to be doped with nitrogen (N) in an amount sufficient to form a localized level; and
said saturable absorbing layer ~~includes a III-V alloy material~~ comprises at least one of As and P.

10 20. (previously presented) A semiconductor device comprising:
a semiconductor substrate of a first conductivity type;

a first cladding layer of said first conductivity type formed on said semiconductor substrate;

an active layer formed on said first cladding layer;

a second cladding layer of a second conductivity type formed on said active layer; and

a saturable absorbing layer formed on at least portions of at least one of said first cladding layer and said second cladding layer,

wherein said saturable absorbing layer is a mixed crystal of nitrogen (N) with another group-V element, and a band gap of said mixed crystal of nitrogen (N) with another group-V element is reduced by adding nitrogen; and

said saturable absorbing layer is formed to have a band gap energy either approximately the same as, or slightly smaller than, said active layer.

11 12 21 (currently amended) The semiconductor device according to claim 19, wherein said first cladding layer and said second cladding layer comprise one or more group-V elements selected from a group consisting of As, P, and Sb; and

~~said first cladding layer and said second cladding layer do not substantially include nitrogen.~~

12 13 22 (previously presented) The semiconductor device according to claim 13, wherein said first cladding layer and said second cladding layer comprise one or more group-V elements selected from a group consisting of As, P, and Sb; and

said first cladding layer and said second cladding layer do not substantially include nitrogen.